



STIC Search Report

EIC 3700

STIC Database Tracking Number 164778

**TO: Patricia Martin
Location: RND 8a40
Art Unit: 3700
Friday, May 27, 2005**

Case Serial Number: 10/669121

**From: Terry Solomon
Location: EIC 3700
RND 8b31
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Search Notes

No current or past litigation found involving US pat. 6308531.

Sources:

Lexis/Nexis
Questel-Orbit

416042 (09) 6308531 October 30, 2001

Time of Request: May 27, 2005 01:40 PM EDT

Research Information:

Utility, Design and Plant Patents
patno=6308531

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6308531

October 30, 2001

Hybrid cycle for the production of liquefied natural gas

REISSUE: September 23, 2003 - Reissue Application filed Ex. Gp.: 3744; Re. S.N. 10/669,121 (O.G. December 9, 2003)

CERT-CORRECTION: July 20, 2004 - a Certificate of Correction was issued for this patent (O.G. August 10, 2004)

APPL-NO: 416042 (09)

FILED-DATE: October 12, 1999

GRANTED-DATE: October 30, 2001

ASSIGNEE-AT-ISSUE: Air Products and Chemicals, Inc., Allentown, Pennsylvania, 02

ASSIGNEE-AFTER-ISSUE: October 12, 1999 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., AIR PRODUCTS AND CHEMICALS, INC. PATENT DEPARTMENT 7201 HAMILTON BOULEVARD ALLENTOWN PENNSYLVANIA 18195, Reel and Frame Number: 10315/0711

LEGAL-REP: Fernbacher, John M. - ##0

Selected file: PLUSPAT
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Comprehensive Worldwide Patents database

**** SS 1: Results 1**
PRT SS 1 MAX 1 LEGALALL

1 / 1 PLUSPAT - @QUESTEL-ORBIT

Patent Number :

US6308531 B1 20011030 [US6308531]

Title :

(B1) Hybrid cycle for the production of liquefied natural gas

Patent Assignee :

(B1) AIR PROD & CHEM (US)

Patent Assignee :

Air Products and Chemicals, Inc., Allentown PA [US]

Inventor(s) :

(B1) ROBERTS MARK JULIAN (US); AGRAWAL RAKESH (US)

Application Nbr :

US41604299 19991012 [1999US-0416042]

Priority Details :

US41604299 19991012 [1999US-0416042]

Intl Patent Class :

(B1) F25J-001/00

EPO ECLA Class :

F25J-001/02D

US Patent Class :

ORIGINAL (O) : 062611000; CROSS-REFERENCE (X) : 062612000

Document Type :

Corresponding document

Citations :

US3511058; US3747359; US3763658; US4251247; US4274849; US4525185;

US4755200; US4970867; US5611216; US5826444; US6041620; US6041621;

US6065305; DE2440215; WO9527179; WO9611370; WO9713109

"SDG&E: Experience Pays Off for Peaking Shaving Pioneer" in Cryogenics & Industrial Gases, Sep./Oct. 1971, pp.25-28.

Muller, K. et al., "Natural Gas Liquefaction by an Expansion Turbine Mixture Cycle" in Chemical Economy & Engineering Review, vol. 8, No. 10 (No. 99), Oct. 1976.

The Liquefaction of Natural Gas in the Refrigeration Cycle with Expansion Turbine in Erdol and Kohle-Erdgas-Petrochemie Brest-Chem vol. 27, No. 7, 379-380 (Jul. 1974).

Publication Stage :

(B1) U.S. Patent (no pre-grant pub.) after Jan. 2, 2001

Abstract :

Refrigeration process for gas liquefaction which utilizes one or more vaporizing refrigerant cycles to provide refrigeration below about -40 (degree) C. and a gas expander cycle to provide refrigeration below about -100 (degree) C. Each of these two types of refrigerant systems is utilized in an optimum temperature range which maximizes the efficiency of the particular system. A significant fraction of the total refrigeration power required to liquefy the feed gas (typically more than 5% and often more than 10% of the total) can be consumed by the vaporizing refrigerant cycles. The invention can be implemented in the design of a new liquefaction plant or can be utilized as a retrofit or expansion of an existing plant by adding gas expander refrigeration circuit to the existing plant refrigeration system.

Update Code :

2001-45

1 / 1 LGST - ©EPO

Patent Number :

US6308531 B1 20011030 [US6308531]

Application Number :

US41604299 19991012 [1999US-0416042]

Action Taken :

19991012 US/AS-A

ASSIGNMENT

OWNER: AIR PRODUCTS AND CHEMICALS, INC. PATENT DEPARTMENT; EFFECTIVE

DATE: 19991012

ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNORS:ROBERTS, MARK JULIAN;AGRAWAL, RAKESH;REEL/FRAME:010315/0711

20031209 US/RF-A

REISSUE APPLICATION FILED

EFFECTIVE DATE: 20030923

20040720 US/CC-A

CERTIFICATE OF CORRECTION

Update Code :

2004-34

1 / 1 CRXX - ©CLAIMS/RRX

Patent Number :

6,308,531 A 20011030 [US6308531]

Patent Assignee :

Air Products and Chemicals Inc

Actions :

20030923 REISSUE REQUESTED

ISSUE DATE OF O.G.: 20031209

REISSUE REQUEST NUMBER: 10/669121

EXAMINATION GROUP RESPONSIBLE FOR REISSUEPROCESS: 3744

Reissue Patent Number:

20040810 CERTIFICATE OF CORRECTION

Session finished: 27 MAY 2005 Time 20:23:47

QUESTEL.ORBIT thanks you. Hope to hear from you again soon.